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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,593	09/16/2003	Michael A. Centanni	ST8012US	3283
22203	7590	01/10/2006	EXAMINER	
KUSNER & JAFFE HIGHLAND PLACE SUITE 310 6151 WILSON MILLS ROAD HIGHLAND HEIGHTS, OH 44143			MCKANE, ELIZABETH L	
			ART UNIT	PAPER NUMBER
			1744	

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/663,593	CENTANNI ET AL.
	Examiner Leigh McKane	Art Unit 1744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 31 October 2005.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1-9, 11-14, 16-29 and 31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 3-9 is/are allowed.
- 6) Claim(s) 1, 2, 11-14, 16-29 and 31 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____.

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 16, 21, and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 16 and 31, the current amendment limits the metal oxide to “lead dioxide ( $PbO_2$ ).” As lead in this form is tetravalent, the limitation in line 7 of claim 16 and line 4 of claim 31, wherein the metal oxide is “in a divalent or tetravalent state” renders the claim vague and indefinite since lead in this form cannot be divalent. Moreover, in claim 21 the metal oxide is limited to “lead oxide.” As this is most likely a typographical mistake, the Examiner suggests changing “lead oxide” to –lead dioxide— in keeping with the specification and claims. Similarly, “divalent” should be deleted from the claim.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by May et al. (U.S. Patent No. 6,196,052).

May et al. teaches a piezoelectric (quartz) gas sensor 154 for gases coated with an

element from Groups III-VII and having electrodes 158,156. The sensor is coated with a metal, which may be in an oxide form for those gases from Group VI. Suitable metals for Group VI include Ag and Mn. Note that H<sub>2</sub>O<sub>2</sub>, technically a hydride, contains a Group VI element, oxygen. See col.7, line 6 to col.8, line 30. As set forth in the previous Office Action, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987). Indeed, the claimed intended use of the device does not structurally distinguish the present claims from the invention of May et al.. Moreover, note that the sensor of May et al. is capable of detecting hydrogen peroxide through the reaction of peroxide with the metal oxide to form water, oxygen, and the elemental metal.

#### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 17, 23, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over May et al. in view of Stemmle (US 2003/0132279).

May et al. teaches a method of determining the presence of a gas, such as chlorine (Cl<sub>2</sub>),

wherein a piezoelectric (quartz) having a layer of a metal oxide thereon produces a metal/gas interaction product on the surface of the sensor, changing the mass of the sensor and thus the frequency of the piezoelectric. See col.4, lines 53-63 and col.7, line 63. For gases containing Group VII elements (chlorine), a divalent metal oxide (ZnO) can be used as the reactive metal species. See Table, col.8, lines 3-11. May et al. does not teach the use of the gas sensor within a decontamination system. However, Stemmle discloses the use of chlorine gas in the decontamination of mail articles wherein a gas detector is used to detect the presence of sterilant with the decontamination region. See paragraphs [0067] and [0068]. It would have been obvious to one of ordinary skill in the art to employ the chlorine gas detector of May et al. in the system of Stemmle as Stemmle fails to disclose a particular type of gas sensor and because the sensor of May et al. is sensitive for even low concentrations of gas species.

7. Claims 18-20, 22, and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over May et al. and Stemmle as applied to claims 17 and 23 above, and further in view of Edwards et al. (U.S. 6,077,480).

The combination of May et al. with Stemmle fails to teach the detection of hydrogen peroxide or the use of hydrogen peroxide as the sterilant. Edwards et al. teaches a system for bio-decontamination including a system 10 for moving hydrogen peroxide through a space 32 and a sensor 52 for measuring hydrogen peroxide concentration. It would have been obvious to use hydrogen peroxide as the sterilant of Stemmle, as hydrogen peroxide is disclosed by Edwards et al. to be effective at low temperatures and to be extremely safe, breaking down into only water and oxygen. See col.1, lines 18-25. Furthermore, one would have found it obvious to employ the gas sensor of May et al. to detect hydrogen peroxide because May et al. teaches that

the gas monitored by the sensor “may be any suitable vapor or gas component(s) such as gases containing Group III-VII elements of the Periodic Table.” See col.7, lines 37-40. Hydrides of Group VI elements are specifically enumerated, which would intrinsically include hydrogen peroxide. See col.7, lines 58-60. As the metal/metal oxides disclosed by May et al are intrinsically capable of reacting with hydrogen peroxide and as the determination of an appropriate reactive metal species is fully within the ordinary skill of one in the art, it would have been obvious to one of ordinary skill in the art to use the gas sensor of May et al. for the detection of hydrogen peroxide.

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over May et al., Stemmle, and Edwards et al. as applied to claim 28 above, and further in view of Schönfeld et al..

The combination *supra* fails to teach the resonant frequency of quartz. Regardless, Schönfeld et al. discloses that piezoelectric crystals generally have a fundamental oscillation of 0.1 to 30 MHz. Therefore, it would have been obvious that the quartz of May et al. would have fallen within this range.

***Allowable Subject Matter***

9. Claims 3-9 are allowed.
10. Claims 16, 21, and 31 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.
11. The following is a statement of reasons for the indication of allowable subject matter and the reasons for allowance: The prior art of record fails to teach a piezoelectric element having a

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lead dioxide ( $PbO_2$ )-containing *coating* (claim 3) or a lead dioxide coating (claims 7 and 21). Moreover, the prior art of record fails to teach or suggest a substrate exhibiting piezoelectric properties having first and second major surfaces and a layer of lead dioxide supported by at least one of said first and second major surfaces (claim 16). Lastly, the prior art of record fails to teach or suggest a piezoelectric device that supports lead dioxide that interacts with a sterilant in the system (claim 31). Although the prior art is replete with use of lead dioxide and lead oxide in combination with other metallic oxides to form the piezoelectric itself (see e.g., Ishihara et al., PTO-892, paper no. 011905), none of the prior art references of record teach or suggest providing a layer or coating of lead dioxide *separate* from that forming the piezoelectric itself, such that the lead dioxide is at least capable of reacting with the sterilant gas. Although May et al. teaches the use of many metal oxides supported or coated onto the surface of a piezoelectric device, May et al. only uses transition metals (Cr, Mn, Fe, Ag, Cu) when sensing Group VI gases (hydrogen peroxide) and metals from Groups IA, IB, IIA, and IIB when sensing Group VII gases (chlorine). See col.8, lines 3-30. There is simply no teaching or suggestion to use lead, which is not a transition metal or a metal from Groups IA, IB, IIA, and IIB, as the reactive metal for sensing in the invention of May et al..

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

12. Applicant's arguments filed 31 October 2005 have been fully considered but they are not persuasive.

13. With respect to Applicant's arguments inasmuch as they apply to the outstanding rejection of apparatus claims 1, 2, and 11-14, the Examiner notes that these claims do not require lead dioxide as the catalytic coating. They only require a divalent or tetravalent metal-oxide reactive layer upon a piezoelectric substrate/element and the *ability* to react with hydrogen peroxide. As May et al. discloses piezoelectric sensors having metal oxide coatings of some of the same reactive metals disclosed by Applicant (Ag, Mn), they are at least *capable of* applicant's claimed catalytic reaction with hydrogen peroxide. A recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations, *Ex parte Masham*, 2 USPQ2d 1647.

14. As to the rejection of the method and system for detection of hydrogen peroxide using the piezoelectric sensor, the Examiner has provided motivation for the combination of May et al. with Stemmle and Edwards et al.. Moreover, although Applicant submits that May et al. provides no indication that the metal oxides would have been effective in detecting hydrogen peroxide through catalytic reaction, the Examiner respectfully disagrees. May et al. clearly teaches that Group VII hydrides can be effectively detected using oxides of metals, such as divalent ZnO. The skilled practitioner, through routine experimentation, would have determined the most appropriate metal oxide for the gas specie being detected.

***Conclusion***

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leigh McKane whose telephone number is 571-272-1275. The examiner can normally be reached on Monday-Thursday (5:30 am-2:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Leigh McKane*  
**Leigh McKane**  
**Primary Examiner**  
**Art Unit 1744**

elm  
9 January 2006